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Article

Where There Is No History: How to Create Trust and Connection in Learning for Transformation in Water Governance

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Abstract: Trust is often seen as an important element in settings of knowledge sharing and the co-creation of knowledge for dealing with transformations in water governance. However, seemingly similar conversations during a co-creation workshop in Uppsala resulted in both trust and distrust, and thereby influenced consequent possibilities for the co-creation of knowledge. Therefore, this article focuses on how trust influences knowledge sharing and how knowledge sharing influences trust. We use a case study approach to analyze the Uppsala co-creation workshop—part of the *Climate Change Adaptation and Water Governance* (CADWAGO) project—by comparing 25 conversations, making use of theories on swift trust and trust dynamics. We found four different conversation patterns (1) sending; (2) defending; (3) misunderstanding; and (4) connecting. The first three patterns influenced trust negatively and did not lead to knowledge sharing, whereas pattern four showed trust development and co-creation of knowledge. From our comparative analyses, we conclude that trust starts to emerge when there is mutual openness and empathy visible in turn-taking patterns. More specifically, trust emerges when communication styles allow for recognition and exploring underlying needs and wishes, resulting in a more dynamic dialogue, further trust development, and connection between actors. Our list of conversation patterns is provisional but we argue that understanding how different kinds of interactions can lead to trust or distrust is crucial to understanding why and how learning takes place—insights that are essential for fostering learning and transformations in water governance.

Keywords: trust dynamics; climate change adaptation and water governance (CADWAGO); knowledge sharing and use; swift trust; social learning

1. Introduction

In order to achieve scientifically rigorous and socially robust solutions in transformations towards sustainable water governance, various actors initiate gatherings for co-creation of knowledge between science and practice [1]. In Uppsala (Sweden), one of these learning settings was a speed-dating workshop. In this workshop, 25 short conversations took place between local actors and student teams working on a solution for dealing with storm water. Although the conversations all took place in the same setting, and were seemingly equal, some conversations resulted in mutual trust and knowledge exchange, whereas in other conversations no knowledge exchange took place and

participants expressed a feeling of distrust. Consequent to these experiences, the question arose: how does trust influence knowledge sharing and the co-creation of knowledge for transformations in water governance?

In recent decades, growing attention has been paid, in both science and practice, to climate change and water governance (see amongst others [2]). Widely debated and well-known examples include for instance studies dealing with mitigation and adaptation, water safety, and the supply of safe drinking water. Consequently, a growing body of knowledge is available to guide policymaking and practice [3]. However, a growing body of knowledge does not necessarily lead to better ways of dealing with environmental challenges [4]. The extent to which knowledge is utilized depends, amongst other things, on the type of knowledge, how it is produced and by whom, the accessibility of the knowledge, and how it is shared and interpreted by those making decisions on environmental issues [5]. As environmental problems are complex, the framing of problems and solutions is strongly related to interests, norms, and values [6]. Therefore, knowledge claims in environmental debates are often contested.

In order to achieve solutions and take account of the different interests and the different kinds of knowledge that reside in the actors involved, governments, non-governmental organisations (NGOs), and other organizations have turned to participatory processes [7,8]. In these processes, the focus is often on solving an issue at hand [9]. However, in recent years, both scientists and researchers have argued that the focus should shift from problem solving to joint learning about the way the issue is framed as a system of interest [10] or a problem [11]. It is believed that when actors can learn to better understand the issue at hand and one another's point of view on what the problem is represented as being, they can come to more efficient, democratic, and legitimate solutions that enable them to deal better with the situations at issue [12]. Since then, learning approaches have gained wide attention in water management and climate change adaptation practices [13–15]. In these studies, learning is broadly referred to as a process of co-generating, sharing, and using knowledge in practice among different actors [4,16].

In these co-production-of-knowledge processes, concepts such as sense-making, learning capacity, cross-boundary competences, leadership, and trust, to mention but a few, are seen as important. Following our initial surprise at the outcome of the speed-dating workshop, this contribution focuses on trust. Furthermore, theory shows that trust between actors is seen as vital to fostering learning [3,17]. Various authors attribute different characteristics to trust in learning processes. A first group sees the creation of trust as a reason to organize learning processes. Thus, trust building is an objective and an outcome of the process [4]. Secondly, and most dominantly, a wide range of authors underline the importance of trust in learning processes as it smooths the process and the exchange of knowledge [18–20]. For instance, authors argue that trust is vital as it allows people to be open and share insights and information [19]. Others add to this and argue that trust helps to deal with essential elements of learning processes such as change and uncertainties [21] or state that trust is a key determinant of the success of learning processes [22] and a prelude to achieving collective insights and solutions, such as co-management. However, despite the different characteristics attributed to trust, trust in learning settings has hardly been studied empirically.

As a result of this knowledge gap, it is unclear how trust emerges and develops in learning interactions and influences the co-production, sharing, and use of knowledge in these settings. Therefore, to investigate trust in learning settings in practice, we focus on learning interactions in a workshop setting focused on knowledge sharing and the use of knowledge for innovative solutions and systems change in water governance. This workshop was organized as part of the CADWAGO project and the ReSolve project. CADWAGO stands for *Climate Change Adaptation and Water Governance—reconciling food security, renewable energy, and the provision of multiple ecosystem services*. In this workshop, student teams working on innovative solutions for dealing with storm water in the urbanizing area on the edge of Uppsala discussed their plans with local and regional actors to improve the students' designs. To gain further insight into the importance of trust in learning

processes, we investigate its role in the workshops, how it influenced knowledge sharing, and how it was influenced by knowledge sharing.

In the remainder of this article, we first explore theoretical insights on learning and link them to insights on trust dynamics. This exploration is utilized to analyze the workshop. Then, the workshop and its broader context are introduced and analyzed. Finally, the article closes with a discussion and conclusion.

2. Theory: Knowledge, Learning, and Trust Dynamics

The attention on new forms of producing, sharing, and using knowledge and learning has grown over the last decades in the fields of climate change [23,24] and water governance [21,25,26], resulting in an ever-growing number of studies. According to the review by Fazey and others [4], there are many definitions and many different terms to describe these processes. Examples include: post-modern science [27], mode 2 science [28,29], co-production of knowledge [30], and knowledge brokering [4,31]. These various terms originate from extensive research in various disciplines including science and technology studies, innovation studies, business and organizational management [32], international development [33], political science, and natural resource management [34], to name but a few. The use of these different terms is not without consequences, as they are all supported by varying underlying assumptions, resulting in different practices [35]. Notwithstanding the differences, they all share the commonality that they focus on, or aim to deal with, *“a process of generating, sharing, and/or using knowledge through various methods appropriate to the context, purpose and participants involved”* ([4], p. 20). The approaches have in common that they argue that there has been a (paradigm) shift in undertaking science. They all argue that an increase in the complexity and uncertainty of scientific questions should likewise result in an increase in the democratization of procedural rules as to how to undertake science. Thus, when complexity and uncertainty are low, science can proceed in a more orthodox manner. In the face of uncertain, complex questions (e.g., environmental risks) however, scientific methods of knowledge break down, as values and uncertainty require scientists to look beyond the facts to include other thoughts, observations, and data—and therefore include laypeople, the public sphere, the parliament, and politicians—in the production and use of knowledge.

The growing number of involved actors and their variety has resulted in the understanding that the production, sharing, and use of knowledge constitute a multi-directional process including co-production. Consequently, learning is broadly understood as a social process within or between groups and individuals [4,16,36]. Viewing learning as social learning is widely debated (see amongst others [19,37]), but the different conceptualizations of social learning are consistent in that they all underline the wide variety of actors and related understandings involved: *“... the collaboration between people who privilege different forms of knowledge or ways of knowing”* ([37], p. 36). In addition, social learning is seen as a process that results in a collective change in understanding or a change in understanding amongst involved individuals that becomes situated in wider communities [19]; these, however, do not necessarily lead to the intended outcomes, e.g., more sustainable use of resources [38]. Consequently, these learning processes are regarded as heterogeneous and dynamic, and many authors emphasize the inevitable role of dialogue and negotiation in these contexts [39]. In relation to different groups negotiating and working together (e.g., academics, farmers, and nature conservationists), trust is identified as a key element [4,14]. Despite this claim, trust has hardly been studied empirically in learning settings, and the question of how trust influences learning, and vice versa, remains unanswered.

Trust has been an object of study for several decades in, amongst other fields, social psychology, organization studies, and public administration [40]. Most of these studies focus on measuring trust or the object or form of trust [41]. In response to this, a smaller group of studies has challenged this dominant approach by emphasizing the development of trust in interaction, and by studying this from a dynamic perspective [41–43]. From such a dynamic perspective, trust can be conceptualized as individuals' expectations about the thoughts, behavior, and decisions of other people [41–44].

These expectations are constantly balanced in terms of past experiences and what one person knows about another person [41,45]. The image of the other is constructed out of accumulating events within their context and the interpretations of these events, simultaneously influencing one another [46]. Given this image and its relation to present-day events, individuals may experience uncertainty, risks, control, and vulnerability. These experiences influence not only the perspective on the past, but also expectations about future events, actions, and decisions in relation to the particular trust situation. In this process, the collective or common history and interactions that build upon one another over time between trustors and trustees are highly relevant. For learning interactions, we therefore expect various learning interactions, or patterns within interactions, to build upon one another and influence trust development.

However, in many learning settings—e.g., workshops, seminars—actors are often meeting one another for the first time, and there is no collective history. Nevertheless, they are entering a setting in which they are expected to learn from one another. This requires at least a certain extent of mutual trust [47]. In these types of temporal or initial situations, it is argued that there is a form of trust often referred to as initial trust or swift trust [48,49]. This form of trust is regarded as very fragile, as it lacks a collective history and is based on impersonal antecedents [49]. These antecedents can relate to personality traits, group reputation, institutional factors, and/or situational factors. Firstly, personality traits relate to what people know about the others' personality, for instance from others or through the first interactions [50]. Secondly, group reputation relates strongly either to whether the trustor and trustee belong to the same group or to whether the other is part of a group that is regarded as trustworthy [51]. Thirdly, institutional factors are about the formal and informal (social) rules that structure society: rules that may reside in legal frameworks but also in commonly accepted behavior [52]. Fourthly, situational aspects, such as the setting in which the interaction takes place, are a last and strongly-related factor. From a dynamic perspective, these four aspects all relate to one another. However, it is less clear how these elements of swift trust play a role in interaction and contribute to trust dynamics and development.

Following these four groups of highly related antecedents of swift trust, and the notions on trust development from the dynamic perspective on trust, we turn to a learning setting. We analyze the different conversations taking place in a governance learning event within the CADWAGO project. More specifically, by using these notions on initial trust and trust development, we focus on how trust influences learning interactions.

3. Materials and Methods

Our analysis is based on materials collected during the CADWAGO project. CADWAGO was an international, three-year project that aimed to improve water governance by developing a more robust knowledge base and enhancing capacity to adapt to climate change [53]. It brought together 10 partners from Sweden, the United Kingdom, Italy, The Netherlands, Australia, and Canada. The project followed a call put out by a trio of European Foundations—*Compagnia di San Paolo* (Italy), *Volkswagen Stiftung* (Germany), and *Riksbankens Jubileumsfond* (Sweden)—as part of the Europe and Global Challenges Programme. One of the work packages, Work Package 4 or WP4, focused on governance learning. It facilitated CADWAGO's learning beyond the project staff to the wider European water governance environment by organizing learning interactions between researchers, practitioners, and policymakers. The aims of WP4 were to (1) design and operationalize an enabling environment for co-production of knowledge processes to emerge; (2) analyze these processes and reflect on them; and (3) use these findings to contribute to increased governance learning that can help to bring about desirable change in the European water governance domain. To achieve these goals, several governance learning workshops were organized in close collaboration with other projects. One of these workshops was the speed-dating workshop in Uppsala, organized together with the ReSolve project as part of the ReSolve competition. In the ReSolve competition, five student teams competed with one another for the best innovative solution for dealing with storm water in Uppsala.

Uppsala is located at one of the lowest points in Sweden, and in times of heavy rain the city faces high levels of storm water. Especially in the urban areas built on the edge of the city, in the lower areas at the south-east side of the city, storm water causes problems leading to flooding of streets and buildings. The ReSolve competition was initiated to come up with innovative ideas for dealing with storm water problems in these urban areas.

Data were collected by means of participant observation by the authors and members of the ReSolve project who collectively designed and organized this workshop. During the event, we divided our attention between facilitation and organization, and observation and recording of reactions, questions, and conversations of the local actors and the student teams. The speed-dating conversations were recorded by means of field notes and audio recording. Relevant parts of the audio recordings were transcribed and compared for analysis. The field notes were categorized into notes related to: “context”, “interactions”, and “observations”.

Following the hermeneutic interpretative analysis approach [54,55], analysis of the content took place during the learning event, during the evaluative conversations, and “out of the field” in the weeks and months following the events, as well as during the writing process. Conversation patterns started to emerge from the reading and re-reading of the material collected. In line with the literature on swift trust, particular attention was paid to patterns of initial trust (personality traits, group reputation, institutional factors, and situational factors) and trust dynamics, in order to explore patterns that could explain why certain conversations led to trust and others did not. The analysis presented below is the result of this iterative process.

The ReSolve Innovation Competition was part of the Resolve project, a Swedish project in the Uppsala region. The ReSolve Process is a circular project process for a multi-stakeholder project tackling sustainability challenges. It helps practitioners to think about and analyze challenges systematically as well as create and implement innovative and resilient solutions in a collaborative manner [56]. In the competition, the five student teams, supported by business entrepreneurs, worked on innovative solutions to tackle storm water challenges in Uppsala and raise awareness on water-related issues in the region. The students were a mix of Swedish and international students with diverging curricula ranging from bio-engineering to environmental sciences. The student teams developed the ideas on their own, in collaboration with entrepreneurs from the region, a series of lectures, and the speed-dating workshop.

The speed-dating workshop was organized halfway through the process on 19 May 2015 at the Department of Geosciences of Uppsala University. During the workshop, the student teams presented their draft designs to various local actors. For all participants, this was their first time meeting one another. In total, five representatives of five groups of actors, all based in Uppsala, participated in the workshop, namely, *Uppsala Kommun* (local authority), *Uppsala Vatten* (drinking water company), *Fålhagen* representative (local neighborhood), *Rosendal Gymnasium* (school), and *Naturskyddsföreningen* (nature conservation NGO). The speed-dating workshop was organized as a carousel, allowing each group of students to present their plan to each local actor separately. After the short presentation by the students of about five minutes, there were five minutes for a conversation with the local actors. After these 10 min, the students shifted to meet a new group of actors (see Figure 1), creating a total of 25 conversations. This set-up was chosen to allow the students to get input from various actors with different perspectives without having to present their plan to the whole group, as this would spoil the competition element. The sessions were preceded by a general introduction. After the workshop, an evaluative conversation was organized with the local actors as well as an informal conversation with the student teams.

This interpretive methodology [54,55] provides insight into the multiple meanings and interactions that characterized this unique setting. We started from the presupposition that meanings and interactions are context-specific to the place and time in which they occur. As we were interested in these situated meanings and interactions, we did not define our concepts a priori, operationalize them as variables and then select our case on the basis of these operationalized variables. Instead,

the case itself presented us with a surprise in the form of a juxtaposition between our expectations (based on theoretical notions on trust and learning) and our empirical observations. As such, this paper does not aim to establish causal inferences, test hypotheses or generalize our findings empirically. Rather, this paper generalizes the ‘how’ of the process in terms of providing an understanding of the variety of possible meanings and interaction patterns in conversations and the consequences of these for trust and learning. The transferability of our findings to other contexts and settings depends on similarities between our description and what you—as our reader—recognize in this description (both empirically and theoretically). Therefore, we collected and reported detailed accounts to allow judgement from you—our reader—about the applicability of certain observations in our case to your own situation. Hopefully, you will recognize at least parts of our story and find it useful to your own situation empirically, theoretically or both.

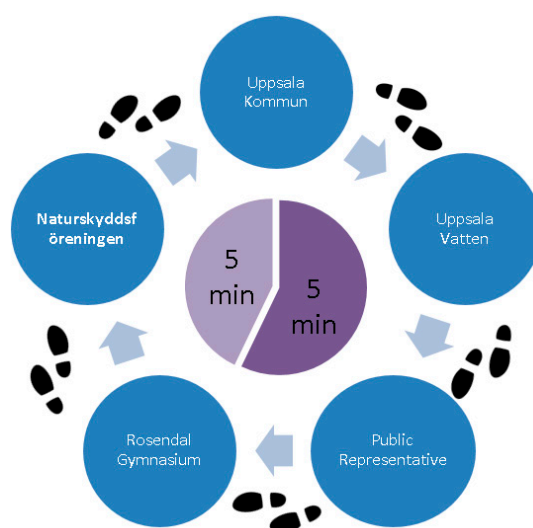


Figure 1. Speed-dating carousel. *Uppsala Kommun*: local authority; *Uppsala Vatten*: drinking water company; *Rosendal Gymnasium*: school; and *Naturskyddsföreningen*: nature conservation NGO.

4. Results

4.1. The Conversations

Looking at the 25 conversations, we can roughly distinguish two phases, namely, the first phase or first encounter and related initial interactions in which the students presented their work; and a second phase, in which the conversation developed and the aim was to share and exchange information.

In the first phase, the context of the workshop situation strongly influenced the conversations. An important institutional factor in this case was the reputation of the Swedish university, which in this local context is generally regarded as a trustworthy institution [57]. This trustworthiness, also referred to as confidence in the institutional context, created a safe venue for the workshop, enabling students and representatives to engage in the speed-dating workshop. This created a similar starting point for all groups; but in practice, we nevertheless observed differences in the way the initial interactions developed. The workshop started with a general introduction about the competition and an explanation of the working methods and workshop set-up. Directly after, the local actors were all seated at separate tables in the lecture room to begin the speed-dating encounters. The different student teams and local actors were not introduced to one another in the plenary part of the workshop, although some informal introductions took place. Consequently, the student teams and the local actors first introduced themselves in the speed-dating carousel. After the formal introduction, the student teams started by presenting their plans and the local actors listened.

For all groups, the situation created with the fixed presentation format was the first structure of the conversation. However, there were some differences between the groups. It became clear that the local actors' background or institutional affiliations strongly influenced the conversation. For instance, one of the local actors was the headmaster of a high school. Although none of the student team members had attended his school, it was clear from the formal attitude at the beginning that his status as representative of this institution played a role. For instance, the headmaster spoke with dignity, and, because of that, and the fact that the students related closely through their experience to the authoritative role of the headmaster, he was the only one addressed as "sir":

S: *So what you and your team are proposing is a warning system, not a solution.*

G: *Oh no sir, it is much more than that, it is also [a design] with green roofs . . .*

This example shows how the headmaster was approached with a certain formal respect. In addition, the observations show that he interrupted the short presentations. This could be understood because of his social and communicative skills, strengthened by his role as headmaster, part of a respected institution. In addition, the combination of his role and personal characteristics and professional skills created a trustful environment that allowed questions to be asked in both directions. This stimulated a conversation without the headmaster dominating it, and a feeling of openness that ideas could be shared and would not be judged or used in a wrong way.

Personality characteristics could also have a negative impact on the conversation. In another situation, one of the student teams was represented by only one member. In the conversation, the student presented a plan that included the implementation of a very technical solution. Although all participants had a technical background, the student was unable to explain his plan in a way that could be understood by the local authority. Observations showed a reluctant attitude on the part of the local authority, and that its representatives hardly asked any questions. From these observations, at the beginning of the conversation it became clear that this created a big gap between the student and the local authority, as could be noted from their response afterwards: *"it was a highly complex presentation, and we were not sure what the guy was talking about [. . .] we were stumped and confused and unable to ask questions."* This situation persisted throughout the conversation, as the student was representing the team on his own and therefore there were no other team members to change the course of the conversation.

In addition, from other examples about personality characteristics it became clear that, when people interacted and both sides had an open and enthusiastic attitude or communication style, this resulted from the start in more in-depth conversations than when one or both sides had a more introverted attitude or behaved more hesitantly. For instance, one conversation between the *Uppsala Kommun* and a student group started with small talk, little jokes, and laughter. In the conversation that followed, the connection between the students and the representatives contributed to an open atmosphere, and questions about the content were posed in a direct way.

This last example also shows the importance of group characteristics. In this example, the local actor's personality characteristics in combination with the in-group characteristics and related communication style of the student group influenced how the conversation progressed. The open character was created by the whole student group and not only by one member together with the local actor. In addition to group characteristics, mutual interests played a major role in the conversations. Concerning mutual interests, it became clear that participants with a similar background, especially participants with similar interests, e.g., environment or social development, connected with one another much faster than others. The nature organization representative was, for instance, very enthusiastic about a plan of one of the student groups that proposed a green solution consisting where the road would be situated in a tunnel, which focused greatly on the involvement of local inhabitants, a green area: *"Yes, this sounds interesting! It involves local inhabitants, gives room to cyclists and is very green. Something we badly need in this built-up area."* These examples show the importance of shared group interests.

In relation to the group characteristics displayed by the student groups during the initial presentation, observations show that the interaction between the in-group style of the student teams' communication and the local actors' communication style greatly influenced the discussion. For instance, in several conversations, one student presented and other members of the team added information in a flexible and interactive way. These interactions were received with a lot of non-verbal positive communication and nodding from, amongst others, the public representative, followed by an open discussion to which many different group members contributed. Later, in the evaluation, one of the local actors was very positive about this conversation. He said: *"yes, this was very nice, there was a lot of interaction from the beginning, and the way the group acted was the way I would have done it."* This shows that both intergroup and intragroup characteristics have a great influence on swift trust between actors, and thus on knowledge sharing.

4.2. The Relationships Develop

Looking at how the interactions developed, and from the empirical material, we can roughly distinguish four patterns. These patterns greatly influence trust development. The first three patterns all show interactions in which there is no connection or the connection between the actors is lost. First, there are groups in which the interactions are characterized mainly by sending. A second group shows patterns in which people were also sending but with a great will to connect to the other. The third form shows mainly sending and confirmation. The fourth pattern is an example of an interaction in which a connection is established. This represents an example of confirmation and reflection.

4.2.1. Sending

In sending interactions, we see a pattern in which one of the participants is sending information without the conversation partner responding to it. This pattern was visible between several teams and their conversation partners throughout the speed-dating conversation. For instance, one of the student teams was talking about systematic approaches, and, although it was part of the objective of the workshop, the local authority was interested mainly in technical data. In these interactions, the needs of neither side were met, and connection seemed limited. A clear example of such a conversation is the interactions between one group (G) proposing a technical solution, and a local actor (S) trying to understand the complex situation:

S: *What you propose is a warning system not a solution!*

G: *No, no, it is more! It is also about green roofs. We know it works, but to make it operate in a proper way you have to monitor, you have to keep track. It is also the idea that this solution creates opportunities to learn and study, the high schools can be an important group.*

S: *Is it compatible with other plans in the area?*

G: *Yes, you have many opportunities.*

S: *How does it work?*

G: *It is with a laser beam and measure pitches, broadcast, and drones. They warn and then you can respond as government.*

This section shows a student team (G) that is trying to explain its plan and a local actor (S) who is trying to understand it. However, in the conversation it is clear that both sides hardly respond to each other. The student team is sending its message and does not respond to the real concerns of the local actor. On the other hand, the local actor does not give input, information, or knowledge about his or her point of view, mostly asks closed questions, and does not ask any follow-up questions. Thus, the participants' personality characteristics remain of influence, with the result that they only talk about their own ideas and questions are asked but not answered. Consequently, there is no visible connection, and no conversation takes place in which points of view can be exchanged or a collective perspective constructed. Both conversation partners seem to be talking past each other. Moreover, in the evaluation, the local actor admitted that he was not feeling comfortable with the situation, did not understand the story at all, and therefore was reluctant to share his concerns and interests.

4.2.2. Defending

In defending interactions, the groups were eager to connect but were unable, and started to defend their plans. As stated, the aim of the workshop was to connect to one another's ideas and share insights about the possible future solutions for dealing with storm water in Uppsala. In several interactions—or parts thereof—a pattern was visible in which, often, participants were aiming to connect. In these interactions, an interesting pattern becomes visible, starting with an open attitude visible by questions and nodding, followed by difficulties in responding. This is exemplified by the following conversation between a student team (G) and the water board/drinking water company (S).

- G: *In our plan, we want to install sensors and drones to monitor the water and water quality.*
 S: *Yes, mmmm yes.*
 S: *You talk about monitoring, how do you deal with water on the street?*
 G: *Yes, we do this with . . . which are highly sophisticated models and techniques for water and drinking water measurement.*
 S: *Well, but how do you deal with storm water, and the street?*
 G: *We involve the public through participation, and look at water quality, surface water, and have a holistic take on the question of water in Uppsala.*

From this conversation, it was clear that initially the audience was directly caught by the student team's story, as was strongly visible through their body language and nodding. After the positive beginning, a recurring pattern became visible in which the student team tried to get its message across to the water company so strongly that the students did not see that they were unable to answer the water board's questions. As a result, no connection was made in the end. Here, the interaction pattern was different from the first pattern as, especially the students, kept on trying to explain their plan to the local actor without checking what exactly he wanted to know. This eagerness to get the message across seemed to be present throughout the group as an in-group characteristic. Consequently, the connection between the actor and the students got lost. When this conversation was discussed with the participants from the water company, they expressed their enthusiasm for the plan at the beginning of the presentation and the openness of the story. But, in the words of the water company "*the student team kept on explaining*". This was an experience that was recognized by other participants, especially when referring to the situations in which the local actors were initially enthusiastic and expected a fruitful discussion, but no discussion unfolded because the students kept explaining. On the other hand, the students expected this in the context of a speed-dating workshop but stated that they felt they were missing some key information—information that was not always shared with them during the conversation although they tried to connect to the local participants as well as possible. Interestingly enough, the results show no example of self-reflection by the students in terms of interactions in which they ask for clarifications. On the contrary, the students remained rather defensive in their explanations. As a result, the connection needed for effective knowledge sharing and learning broke down.

4.2.3. Misunderstanding

Misunderstanding interactions started out in a rather open manner, and the stories of the student teams and the local actors were agreed upon. Here, a sense-making process could be seen. However, the different participants still seemed to speak a different language, the interactions did not build upon one another, and consequently no connection was established during the interaction, or the connection was lost. One of the conversations was for instance on the location of the water in the plan:

- S: *The water level is higher than the road in your plan, isn't that a safety problem?*
 G: *No, in this case it isn't. The green is doing all the work, it purifies the water.*

Here, it can be seen that, although both participants talk about water and they respond to each other, the local actor (S) is talking about water levels, whereas the student team (G) is talking about

water quality. These types of interactions were found in different conversations and could be fostered by the participants' wide range of professional and institutional backgrounds. In relation to the above example, the differences in language and the consequences thereof were also brought up by participants in the subsequent evaluation. Here, especially the local authority and the water company stated that they understood what the student teams were talking about, but that they failed to get a response in relation to the issues that mattered to them, such as the water levels. And although the students said that they took these aspects into account and tried to respond, the local actors had the feeling that they were not heard and seen by the student teams.

4.2.4. Connecting

In connecting interactions, questions and answers built upon one another, and there were signs of mutual understanding and reflection. This pattern was, at least by one student team, accompanied by a visual presentation, which largely facilitated the conversation. This can be illustrated by a conversation between the local community representative (S) and one of the student teams (G) that presented a sustainable and green solution:

S: Clear pictures and impressions you made.

G: Thank you.

S: So you propose a green zone combined with infrastructure? How about the economic situation in the area?

G: Yes you are right, very important. Especially in the long term, that is also how we incorporated it.

S: Did you see any dynamics in your underlying study so far?

G: Yes, especially economics, investments, and the like. But investments should also focus on the social side; they should focus not only on businesses but also on the long-term social situation.

S: So your solution is ready for the dynamics of time?

G: Yes, we think that is important. Don't you?

S: Yes I do [...]

It is clear from this example that questions and answers built upon one another. The questions were sometimes repeated, verified, or confirmed by the other party, and there was room for reflection on the presentation, ideas, and thoughts. This became evident in the observations also. Although harder to grasp, from the beginning there was a connection between the different participants. The atmosphere was good, as there was informal small talk and jokes were made. The presentation was followed by this open conversation on the content in which there was room for reflection and discussion of ideas. This required openness and vulnerability. Moreover, in the evaluation and informal conversation after the speed-dating workshop, a certain experience of empathy was expressed, as the community representative and the local school headmaster said that they had the feeling that they were taken seriously by the students and that the student team cared about their feelings and needs—namely, that citizens should be central in the plan.

5. Discussion and Conclusions

Analyzing the 25 conversations, we saw several types of patterns along which the learning interactions took place. None of the participants had a collective history, and the conversations were thus ideal for analyzing swift trust. The conversations all had their own dynamics, developing from introductions to full conversations in which, in some instances, knowledge was shared and reflected upon. In these processes, the role of trust is far from static, supporting the idea that the production, sharing, and use of knowledge is a dynamic process [4]. It also shows that trust is not necessarily bound to long processes as often stated [58,59]. In this section, we reflect upon our findings in terms of how swift trust influences the production, sharing, and use of knowledge and learning interactions. Looking at the results, we see a link between initial interactions and later trust dynamics. However,

the distinction between these two is empirically far from clear. Moreover, we found different interaction patterns, with different consequences for the production, sharing, and use of knowledge and learning.

Trust between actors in the learning interactions was influenced by various aspects throughout the speed-dating workshop. In line with Meyerson et al. [48], we saw that, especially in the beginning, personal antecedents, group antecedents, and institutional antecedents were influential in the creation of swift trust. These antecedents, however, did not seem to influence trust directly but had a strong influence on openness, the willingness to be vulnerable and to share information. Amongst others, Mayer et al. [59] and De Vries et al. [46] show that these aspects influence trust strongly. Although participants had never met beforehand, they developed an impression of the other in a very short time. This impression subsequently influenced the expectation of whether knowledge sharing was possible or useful.

Although personality traits, group characteristics, and institutional characteristics are mainly associated with swift trust in the literature [48,51], these traits continued to play a role in our conversations past the stage of initial interaction. However, the situational antecedents were less visible and not directly mentioned. More specifically, our research shows that the antecedents that initially played such an important role function as a frame of reference or first collective history as the conversation continues. From this frame of reference or collective history, conversation partners developed expectations about whether the sharing of information was going to be useful for them, thereby influencing the future interactions and conversations during the workshop. For instance, in several conversations, student teams were unable to link up to what mattered most to the local actors. Consequently, the local actors felt that they could not connect to the student team right from the start, and this feeling stayed with them throughout the conversation. In contrast, in other conversations, the student groups and the local actors did connect right from the start, and they were able to maintain the connection between the two groups throughout the conversation. This resulted in a dynamic distrust or trust, a process that reinforced itself during the conversation.

Looking more closely, we see that, in these interactions, the form and style of input from both sides influenced the interactions a great deal. This contributes to the finding that turn-taking patterns in which actors respond to one another influence trust development [43]. More specifically, we identified three patterns of interaction that led to distrust or at least did not lead to trust development, namely, (1) sending; (2) defending; and (3) misunderstanding. The combination of both students' uncertainty and their eagerness to please the local actors because they depended on their input for their assignment resulted in a lack of connection. More specifically, at certain points in the conversation, participants became stuck in one of these interaction patterns and were unable to really hear, see, and relate to the needs of their conversation partner. Each of these three interaction patterns led to disconnection, thereby resulting in distrust. However, we did not find any evidence that one of these patterns resulted in a complete door-closer or in conflicts that would make it impossible to restore trust and create space for co-creation of knowledge. A valuable direction for further research may therefore be to focus on how these patterns change over time, resulting in people connecting and re-connecting, especially as trust in interaction for transformations in water governance should be understood as a dynamic process, and therefore re-connections can in most cases be made. Such processes, however, depend strongly on the competence, communication skills, and awareness of the participants involved and need to happen in interaction, as trust develops in interaction. This makes it a shared responsibility to be aware of it and of how connections emerge or get lost, and therefore influence the space for knowledge co-creating and achieving sustainable transformations in water governance.

In addition, we identified one pattern of interaction that led to trust, namely, connecting. In this interaction pattern, both conversation partners connected to each other by listening and showing concern for each other's feelings and needs; this resulted in feeling heard and seen in the sense that their point of view was recognized and mattered. This shows the importance of how the story is told in addition to the importance of what is actually said [60]. It is important to note that this did not necessarily imply consensus [14]. It did enable openness, created a sense of trust, and resulted

in learning in terms of a reflection on one's own point of view [61]. This resonates with Scharmer's findings on active listening [62]. He distinguishes four levels of listening: downloading, factual listening, empathic listening, and generative listening, and claims that, although all four levels are useful, learning only takes place through empathic listening and generative listening.

Our list of interaction patterns and their consequences for trust and learning is provisional. From an interpretive perspective we assume that other case settings will generate different situated meanings and interactions, although the underlying processes might be similar. We have shown that trust and distrust are co-created in interaction in many different ways. In an attempt to give this thought some substance we have used different conversations to explore and characterize different interaction patterns. In our provisional list we have identified four of these interaction patterns. However, from an interpretive perspective the co-creation of trust and distrust in interaction is an entirely empirical matter. There will be many other interaction patterns in other settings in addition to the ones that we identified in this paper. As meanings and interactions are context-specific to the time and place in which they occur, we argue that more studies on interactions should investigate learning processes longitudinally and spatially in order to gain further insight into trust in learning interactions. First of all, longitudinal studies are, we believe, highly valuable, as many learning processes take a long time, and subsequent learning interactions build upon one another [3] thereby creating different trust dynamics. Secondly, in line with studies that argue that trust develops not only under the influence of interactions in more public settings [40], we argue for multi-sited studies that take the interactions into account that happen in other sites than public workshops or meetings, such as pre- and post-conversations within participating groups. Focusing on the temporal and spatial dimensions of learning practices allows for scrutinizing the trust dynamics that often guide knowledge sharing, knowledge co-creation, and social learning. This is especially true because focusing on learning practices gives us better tools for analysis and further understanding as to why and how learning takes place—insights that are essential for fostering learning and transformations in water governance.

All in all, from our analysis of the speed-dating workshop, we can conclude that trust in learning interactions for transformations in water governance developed through antecedents that functioned as a first basis for the production, sharing, and use of knowledge. In subsequent interactions, these antecedents continued to play a role and became part of a fragile trust. Trust was influenced by connections made in these interactions about the issues at stake, but above all by the style and way of communicating. These elements have a strong influence on the level of mutual openness and vulnerability, and the subsequent ability to share knowledge and to learn. Furthermore, these initial interactions reinforced themselves by creating the start of a collective history that influenced future interactions, thereby reinforcing dynamics of trust and distrust. In terms of learning processes, this study ultimately shows how the dynamics of such a process [4] can lead to dynamic trust and learning possibilities. It also shows that, even in short and swift interactions, trust can be established and learning can take place. Therefore, learning processes in water governance should pay attention to facilitating and creating an environment in which mutual trust between conversation partners can emerge in order to create space for transformations to happen. Consequently, subsequent interactions should be facilitated while paying attention to people's underlying feelings and needs, taking into account past experiences in order to create possibilities for the emergence of a trusting relationship that enables people to reflect and learn.

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